A SYNOPSIS ON THE TOPIC

STUDY OF IRON AND VITAMIN D_3 IN HYPOTHYROID PATIENTS IN PATHANKOT, PUNJAB AND THE IMPACT OF COVID 19 ON HYPOTHYROIDISM

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CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the thesis entitled,

"STUDY OF IRON AND VITAMIN D_3 IN HYPOTHYROID PATIENTS IN PATHANKOT, PUNJAB AND THE IMPACT OF COVID 19 ON HYPOTHYROIDISM" in partial fulfilment of the requirements for the award of the Degree of Doctorate of Philosophy and submitted in the Department of the biochemistry of the Desh Bhagat University, Mandi Gobindgarh, Punjab is an authentic record of my work carried under the supervision of Dr Savneet Kaur, Assistant Professor, Desh Bhagat University, Mandi, Gobindgarh, Punjab. The matter introduced in this thesis has not been submitted by me for the honour of some other level of this or some other university. This is to confirm that the above assertion made by the applicant is right apparently.

Dr.Savneet kaur

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INTRODUCTION – Hypothyroidism is the condition of the body when the thyroid organ does not make thyroid hormone for utilisation of the body. It is a butterfly-shaped organ placed near the neck. This hormone uses instructs the body in every possible way to utilise the energy as per need Without adequate thyroid hormone, a number of the body's abilities are postponed down.

Hypothyroidism Considerations

Women are much more rational than men to stand in hypothyroidism. The illness is moreover more normal among people more tested than age 60.

You may grieve from hypothyroid if you

- had a thyroid issue previously, like a goitre
- had a medical procedure or radioactive iodine to diagnose thyroid
- Radiotherapy of neck
- Family background of thyroid dysfunction
- Pregnant in the past six months

•have Turner condition NIH outer connection, a hereditary problem that influences ladies

RELATION BETWEEN IRON AND VITAMIN D AND HYPOTHYROID

If you have thyroid illness and exhaustion, iron insufficiency could be at fault. This is particularly obvious in hypothyroidism.

Signs :

- Iron deficiency includes low haemoglobin (a protein in redplatelets).

- Iron inadequacy includes low iron.
- Iron-inadequacy weakness (IDA) includes low iron and low haemoglobin. This article looks at iron deficiency anaemia and hypothyroidism.

Anaemia in Hypothyroidism

The low thyroid chemical degrees of hypothyroidism stifle the action of bone marrow, the tissue that makes red blood cells that bring down red blood cells' creation and triggers anaemia. Research shows as numerous as 43% of individuals with indicative hypothyroidism have IDA. That is contrasted with 29% in everybody. Tireless exhaustion is a principle component of the condition. The connection between iron, red blood cells, and TSH might prompt hypothyroidism by impeding the thyroid organ's typical capacity.

Iron Deficiency

The research proposes that somewhere in the range of 30% and half of the individuals on levothyroxine (a thyroid chemical substitution drug) have an ongoing weakness without proof of anaemia. After precluding different conditions that cause exhaustion, researchers observed that iron insufficiency was at fault, not IDA. Much of the time, the insufficiencies were brought about by an iron-horrible eating routine that existed before the thyroid diagnosis.

Iron inadequacy or IDA and thyroid sickness frequently go together. Hypothyroidism can prompt frailty and can impede thyroid capacity. Iron inadequacy without frailty can likewise cause exhaustion in individuals with thyroid conditions.

Covid 19

Covid viruses are a group of infections that are recognized to make sicknesses from the normal cold to serious diseases like Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS).

A novel Covid (COVID-19) was known in 2019 in Wuhan, China. It's a novel Covid that has not been before recognized in people.

General Symptoms

Cough, Sore throat, runny nose, Headache, Muscle torment.

Review of literature

The thyroid chemical is an important part of our life. There was proof to suggest that low grades of Vitamin D might adopt a part in thyroid issues. Let us explain with an example, a study has suggested a connection between Vitamin D and thyroid issues, in particular Hashimoto's thyroiditis, the most documented reason for hypothyroidism. In one survey, 72% points with immune system thyroid dysfunction incorporated in Vitamin D3. Research held in Greece with Hashimoto's thyroiditis showed that more than 90% of people are affected with low levels of Vit D and high thyroid antibodies. Iron and thyroid are connected. Iron low levels can interfere thyroid organ. Some research showed that iron deficiency can interfere with both T3 and T4 levels.

Thus, the mark of the survey is to check whether there is an association between hypothyroidism and iron digestion.

Vitamin D deficiency "VDD" is presently normally acknowledged as being related to various clinical and endocrine issues. This review recommended a serious level relationship between Vitamin D inadequacy "VDD" and the hazard of paleness in people with hypothyroidism, Vitamin D has regularly been a critical connection with lack of serum ferritin and haemoglobin Hb levels and expanded serum TSH levels contrasted and those ordinary serum 25(OH) nutrient D levels. This is concurred with different examinations that were showed a relationship between Vitamin D3 levels and iron insufficiency in patients "without and ongoing kidney infection" (Peristgein et al, 2011; Patel et al, 2010), while Sonawane et al (2017) recommended that a critical connection between the inadequacy of Vitamin D and expanding serum TSH levels (Sonawane et al, 2017). On the various makes driving the nutrient D insufficiency like diminishing daylight openness and poor digestive ingestion of Vitamin D (Theodore) that the principle activity of nutrient D is the guideline of calcium and bone marrow digestion "counting cell expansion and separation" (Arabi et al, 2010; Norman, 2008). Different examinations like

an exploratory review by Byron Richards (2008) considered, that was showed an absence of Vit D prompting the chance of abatement of thyroid chemicals (Byron, 2008), so the huge negative relationship between's nutrient D and TSH demonstrates the connection among's hypothyroidism and Vitamin D. Then again, the information got that uncovered diminishing in the blood boundaries including haemoglobin. Vitamin D inadequacy and a higher danger of weakness with lower haemoglobin levels (Sharara et al, 2017). Now the link between Vitamin d3 and weakness might be coming about since the influences vitamin D3 on bone marrow digestion like an instant impact on erythropoiesis processes "the component of RBCs development" and afterwards its consequences for haemoglobin levels so it has altogether and positive relationship between's Vitamin D, Iron. Additionally, the inadequacy of nutrient D has a solid impact on the diminished expansion and actuation of RBCs, its extreme effects in the abatement blend and digestion of Iron and haemoglobin at last decreasing bone mineral thickness, in this way influencing "bone development and bone reabsorption" (Katsumata et al, 2009). Then again, there is a critical positive connection between TSH levels with ferritin and Hb prompting the reasoning that a connection between pallor and thyroid brokenness that has been exhibited by the review (Nawras, 2017), which was shown expanding levels of TSH in female patients with hypothyroidism next to diminished of levels of HB when contrasted with sound controls (Nawras, 2017), subsequently concurred with Beard et al (1990), which was found in the review that T3 and T4 levels were altogether declining, TSH levels were fundamentally higher in pallid ladies, and not set in stone that T3 levels have been expanded by treatment with iron (Beard et al, 1990; Lippi et al, 2008.

AIM AND OBJECTIVES

The researcher will conduct the study on people already suffering from hypothyroidism and the researcher will study the status of iron and vitamin d in them. The researcher will take samples of the known hypothyroid patients and pregnant women and study them to analyze the status of vitamin d and iron in them.

To check the suppositions following focuses are the primary targets :

1. To analyse the iron and vitamin D in hypothyroid patients in Pathankot, Punjab
2. To concentrate on the correlation between iron and vitamin D in hypothyroid patients.
3. To study the impact of Coronavirus on iron and Vitamin D3 in hypothyroid patients

4. To track down the co-connection between hypothyroidism and pregnant ladies

5. To find the co-relation between coronavirus and hypothyroidism.

Expected outcome:

The occupation of vitamin D is to control bone breakdown. In old days, the Importance of Vit d in daily activities has been reviewed, it can cause, heart disease, metabolic disorders, sickness and even malignancies. This review will tell the data on the importance of vitamin D in thyroid dysfunction, including autoimmune thyroid diseases Inadequacies of iodine might have an unfriendly impact on thyroid capacity and impact of covid 19 on hypothyroid patients Iron is the most important mineral for thyroid functioning Iron deficiency can also trigger hypothyroidism during pregnancy and in a non-pregnant woman. This review was embraced to explore iron and vitamin d in hypothyroid patients and the impact of covid 19 on hypothyroidism Pathankot, Punjab.

Gaps in the study as per literature review :

Various researchers have studied the role and relation between hypothyroidism, iron, and vitamin D. One of the studies was held in Canada in 2017 in which the author observed that correlation between vitamin D insufficiency and low TSH level during pregnancy however, no evidence was provided on the correlation between vitamin D, FT3 and FT4, therefore, more research must be conducted on a group of pregnant women divided according to weeks of pregnancy, age and meanwhile, the recommendation for vitamin D supplementation is recommended (Nizar BM, 2017). Another study was held in which the author observed that patients with hypothyroidism suffered from hypovitaminosis D with hypocalcaemia. Moreover, the positive significant correlation between each serum Vit D and calcium with thyroid hormones and the negative significant correlation with TSH levels, suggested that deficiency of serum Vit D and calcium levels were significantly associated with the degree and severity of hypothyroidism which encourages the advisability of Vit D supplementation. Screening for Vitamin D deficiency and serum calcium levels is recommended for all hypothyroid patients. (Mackawy, 2013)In this study, the researcher will perform various blood tests among people of Pathankot, Punjab to find

the co-relation between them and to analyze the status of condition in Pathankot.

CHAPTER PLAN

Chapter I: The general introduction of thyroid hormone, iron, and vitamin D and their roles and relation between them.

Chapter II: **Review of Literature**: In this chapter, the researcher will review some studies in which the researcher could find a co-relation between TSH, iron, and vitamin D and some of the studies stated the critical connection among them.

Chapter III :

Materials and methods - In the current review, a blood test will be gathered and led on recent clinical and research facility analyzed patients of hypothyroidism and covid patients. The finding depended on the nitty-gritty history of any ongoing illnesses, for example, "diabetes mellitus, hypertension, liver infection, renal sickness, metabolic bone issues, harm, hypo-or hyperparathyroidism, nutrient and mineral insufficiency, steroid and antiosteoporotic treatment" were barred from the study. Thyroid chemical investigation to decide the hypothyroidism and gauge of serum 25(OH)D3 levels with blood estimation including haemoglobin fixation, ferritin, MCH, MCV, and HCT not set in stone. Serum was isolated and put away at - 20°C for assessment of 25(OH)D3 levels, blood boundaries, and thyroid chemicals. Serum 25(OH)D3 level will be estimated by Chemi Luminescent Immuno Assay strategy, haematology analyzer, and spectrophotometry technique. The normal value of Tsh is 0.3 to 5.5 mIU/ml, Vitamin D3 – 30 -100 ng/ml , Iron – 50 – 170 µg/dL

Principle CLIA :

Chemiluminescent immunoassay is a normal chemical immunoassay (EIA), which is a biochemical method applied in immunology. It can be used as an assumption device in medication, as well as utilized in a few other various businesses for different applications.

During EIA the communication utilizes proteins named antibodies and antigens to classify the little organic atoms required. This approach employs the vital immunology clue that an antigen binds to a specific neutralizer. Those antigen particles can be documented in a liquid.

Principle Spectrophotometer :

The spectrophotometer procedure is to device light force as an element of frequency. It does these by spreading the light pillar into a range of frequencies, unique the forces with a charge-coupled device, and showing the results as a plan on the indicator and the display case device.

Sample size -

The researcher will collect data from various labs and hospitals as per the need. The specified age group will be 20-60. The researcher will collect data from different areas of Pathankot, to sum up to 150, males and females both will be the part of our research and 50 patients will those who were suffered from covid 19 before where the researcher will check the levels of iron and vitamin d and on the other hand researcher will collect 100 patients data who are suffering from hypothyroidism.

Inclusion

- suffering from hypothyroidism and on medicines
- Patients who were recently diagnosed with hypothyroidism
- Patients who are on general supplement levothyroxine
- Patientssufferedfromcovid 19 beforeandwere recovered
- Pregnant women

Chapter IV:

Site of Research area: The site of the research area will be Pathankot and its nearby locations.

Chapter V :

Results and Conclusions: In this chapter, the conclusion will be made after analyzing the status of vitamin d and iron levels in hypothyroid patients and the appropriate relationship between them and the impact of covid 19 on hypothyroid patients.

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